



## Installation of Automated Flood Gate Controls in Coral Gables, Florida

### Full Mitigation Best Practice Story

#### *Miami-Dade County, Florida*



**Coral Gables, FL** - The metropolitan areas of Southeast Florida were carved almost entirely out of the Everglades. During the early stages of development, the land was frequently inundated with water for long periods of time due to the flat topography, low land elevations, and the high groundwater table in the Biscayne Aquifer. To make the land suitable for habitation, government and private entities constructed a canal system. However, the excavation of the canal system exposed the Biscayne Aquifer, the area's primary source of drinking water, to saltwater intrusion. In order to stem the flow of salt water into the Biscayne Aquifer, salinity control and flood control gates were constructed at the mouths of both secondary and primary canals throughout.

Today, the canal system in Miami-Dade County is a network of approximately 620 miles laid out in an approximate 1- to 2-mile wide grid. The gravity-driven canal system is divided into 360 miles of primary canals and 260 miles of smaller secondary canals. The ability to move water in the secondary system depends on the available capacity in the primary system, which, in turn, is depends on the proper operation of the salinity control and flood control gates.

In the past, one of the Coral Gables Canal's gates had to be opened manually. An operator from the city would be sent to physically open and close the gate as conditions warranted. The gate was difficult and unsafe to operate during hazardous weather conditions; operators were exposed to high winds, lightning, and dangerous road conditions. Furthermore, proper operation of the gate depended on knowing water levels upstream of the gate. Improper operation resulted in frequent flooding in downtown Coral Gables during high rainfall events. Therefore, the city decided to install an automated system that would monitor upstream water levels and open and close the gate safely and more effectively.

The effectiveness of the project was demonstrated by comparing the gate's performance with manual operation in the previous rainfall events before the automated system was in place. The result was significant flooding in downtown Coral Gables in 1977, 1985, 1991, 1995, and 1999—five times in a 25 year period. All of the five flooding events were caused by less than 12 inches of rain in a 24-hour period. In 1977 and 1991, downtown Coral Gables was forced to pump standing water for two weeks after the flood, directly attributable to the difficulty in opening the gates.

During the October 2000 floods there was no flooding in downtown Coral Gables even though the city received 16 inches of rain in 15 hours, about twice as much as previous events that caused widespread flooding downtown. Local officials attributed the success to the performance of the new automated gate control system. To date, 11,638 residents of the basin have benefited from the project.

#### Activity/Project Location

Geographical Area: **Single County in a State**

FEMA Region: **Region IV**

State: **Florida**

County: **Miami-Dade County**

City/Community: **Coral Gables**

### Key Activity/Project Information

Sector: **Public**  
Hazard Type: **Flooding; Hurricane/Tropical Storm**  
Activity/Project Type: **Flood Control**  
Activity/Project Start Date: **11/1995**  
Activity/Project End Date: **09/2000**  
Funding Source: **Hazard Mitigation Grant Program (HMGP); Local Sources; State sources**  
Funding Recipient: **Local Government**  
Funding Recipient Name: **City of Coral Gables**

### Activity/Project Economic Analysis

Cost: **\$83,444.00 (Actual)**

### Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster? **Yes**  
Federal Disaster #: **1062 , 08/10/1995**  
Value Tested By Disaster? **Yes**  
Tested By Federal Disaster #: **No Federal Disaster specified**  
Year First Tested: **2000**  
Repetitive Loss Property? **Unknown**

### Reference URLs

Reference URL 1: **<http://www.nhc.noaa.gov/>**  
Reference URL 2: **<http://floridadisaster.org/>**

### Main Points

- In the past, one of the Coral Gables Canal's gates had to be opened manually. Furthermore, proper operation of the gate depended on knowing water levels upstream of the gate. Improper operation resulted in frequent flooding in downtown Coral Gables during high rainfall events.
- The effectiveness of the project was demonstrated by comparing the gate's performance with manual operation in the previous rainfall events before the automated system was in place.
- During the October 2000 floods there was no flooding in downtown Coral Gables even though the city received 16 inches of rain in 15 hours, about twice as much as previous events that caused widespread flooding downtown.

